REMARKS

Applicants acknowledge the Office Action mailed on January 10, 2006. Applicants request reconsideration of the present application based upon the above amendments and the following remarks. Claims 1-3 and 5-18 are currently pending in the present application.

Claims 1-3, 5-12 and 14-18

The Examiner rejects all pending claims under 35 U.S.C. § 103(a) as obvious based upon the combination of U.S. Patent No. 4,186,054 to Brayton et al. (hereinafter "Brayton") and an article entitled "Coke Production For Blast Furnace Ironmaking" written by Dr. Valia, one of the present inventors (hereinafter "the Valia Reference"). In rejecting claims 1-3, 5-12 and 14-18, the Examiner asserts:

> Brayton, et al. teach a method of producing blast furnace coke by compacting finely divided coal into a compact such that the bulk density is sufficiently increased to be capable of conversion into coke. The compacted coal cake is then carbonized in an oven, which provides coke, which can be used in steel making production. [Note, Column 2, Lines 15-60]. The compacting means can be in any form suitable for compacting the finely divided coal to achieve the desired coal compact. The preferred method of compacting is by using briquetting rolls but is not limited only to briquetting for compaction. The compact of coal is binderless and after compaction the compact is placed into a coking oven wherein the coal compact is carbonized into coke. Brayton et al. teach that the finely divided coal has properties which allows it upon high pressure compaction to develop strong cohesive forces between the coal particles to produce coal compacts of a specific gravity of at least 1.1 and more preferably such that upon controlled handling allows the compacts to partially break up into broken compacts, the individual broken compacts generally maintain the increased density achieved in the compaction step. The breaking step of the process may be carried out by any suitable means to achieve the desired high bulk density in the carbonizing means. [Note, Column 4, Lines 6-20].

See Office Action, p. 3. The Examiner admits that Brayton fails to teach the apparent specific gravity of the coke manufactured in the Brayton process.

In rejecting the claims, the Examiner asserts that the Valia Reference teaches that certain essential steps must be initially performed prior to undertaking the coke making process. These steps include selecting coals from certain mines, oiling and pulverizing the coal and compacting the coal to obtain a desired density. In addition, the Examiner asserts:

> Valia teaches using non-recovery ovens for carbonizing the coal into coke... the differences rest in what is happening to heat utilized in carbonizing the coke, not in how the coal is carbonized to coke, to use any oven would provide an equivalent product this is taught in Valia [*sic*].

See Office Action, p. 4. Moreover, the Examiner maintains that the Valia Reference teaches various factors affect coke quality, such as the type of coal blends used, and the physical and chemical properties of the coal blends. Therefore, the Examiner asserts:

> It would have been obvious from the teachings of Brayton et al. and Valia that applicant's [*sic*] process has been fairly taught and suggested although applicant has argued that the use of the non-recovery oven using a container etc., in the non-recovery oven is different than Brayton, the coke produced would have an apparent specific gravity within the range as claimed by applicant and applicant absent criticality in showing. From the teachings of Valia, one of ordinary skill in the art would not be persuaded that using a non-recovery oven in producing coke would yield a product far superior than using a by-product oven. Applicant is again advised that arguments are not evidence that the blast furnace coke of Brayton et al. may not recite the apparent specific gravity after carbonizing, the coke formed is suitable for use in a blast furnace and there are requires [*sic*] AISI standards which need to be complied with in order to produce a viable coke for use in steelmaking.

See Office Action, p. 5.

The rejection of claims 1-3, 5-12 and 14-18 fails for a variety of reasons. Firstly, by-product ovens and non-recovery ovens are not equivalent and therefore the same process in different types of ovens would not produce equivalent products. Secondly, no reference cited by the Examiner teaches coke with a resulting apparent specific gravity of about 1.05.

Non-Recovery Ovens Differ from By-Product Type Ovens

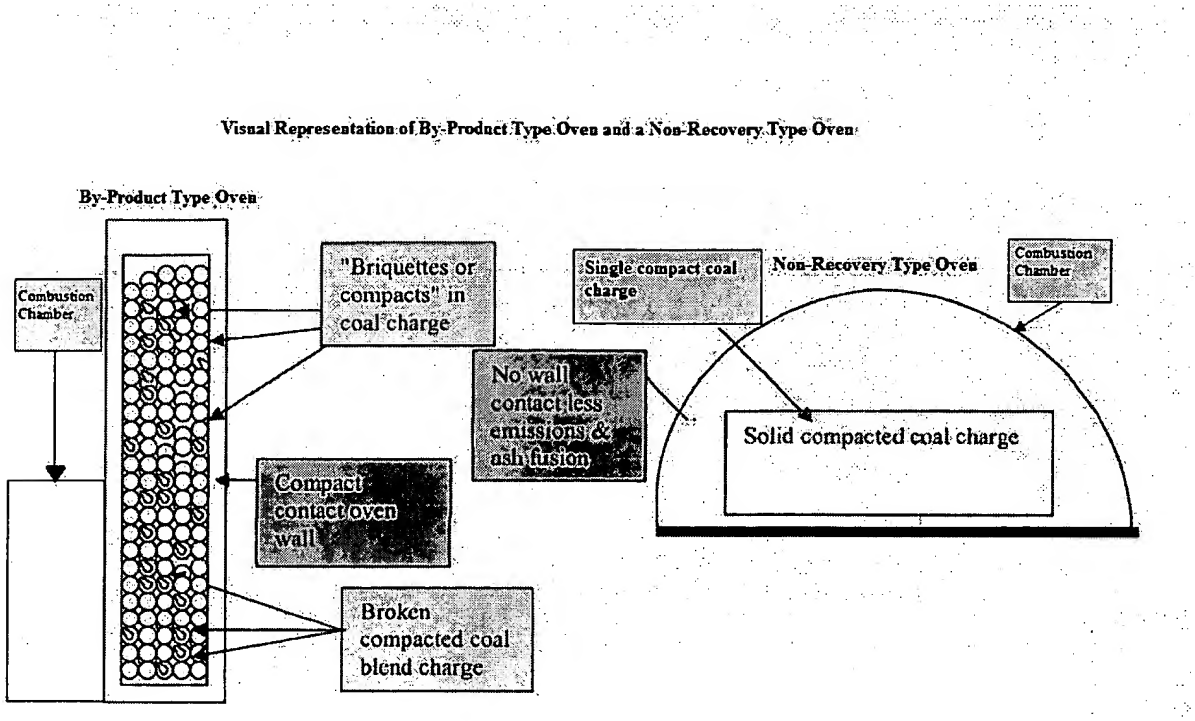
The position of the Examiner that Valia teaches that heat recovery, non-recovery and by product ovens are all equivalent for carbonizing is incorrect. Where does the Valia Reference state that by-product type ovens and non-recovery ovens are equivalent or that they produce the same products following the same process? The Examiner has not indicated where the Valia reference makes such a teaching.

Applicants remind the Examiner that in an obviousness analysis, the prior art teaches all that it conveys to one of ordinary skill. *See W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1551, 220 USPQ2d 303, 311 (Fed. Cir. 1983).

Dr. Valia prepared the Valia Reference in order to provide generalized information to one interested in coke production. The Valia Reference is not a technical paper intended for one with ordinary skill in the art but rather provides generalized information to visitors to a website owned and operated by American Iron and Steel Institute (hereinafter "AISI").

One with ordinary skill in the art would recognize that non-recovery ovens and by-product type ovens function in extremely different manners. For example, the coking time in non-recovery type ovens generally lasts from 24-48 hours. Conversely, the coking time in a by-product type oven is substantially shorter, extending generally from 16.5-19 hours.

The following illustration also visually depicts additional differences between a by-product type oven and a non-recovery type oven.



As can be seen from the above illustration, the mechanism of combustion within the two different types of ovens is also substantially different. In the non-recovery type oven, the chamber of the oven represents the area wherein combustion occurs. In a by-product type oven, however, the combustion occurs outside the chamber at a higher temperature than that of the non-recovery type oven. The heat produced in a by-product type oven combustion chamber passes through a wall positioned intermediate the combustion chamber and the heating area containing the coal to be heated.

In a non-recovery type oven, the coke charge rests against the oven sole, or bottom of the oven, and accordingly, the coke charge barely contacts the oven walls. The lack of contact between the coke and the oven walls reduces the pressure applied to the walls of the oven and generally increases oven life vis-à-vis a by-product type oven. In a by-product type oven, the weight of the charge asserts a force on the sidewalls of the oven, thereby causing stress on the walls and eventually causing the walls to succumb to fatigue.

In addition, the resulting coke differs when produced in the different types of oven. In the by-product type oven, the gas produced during the coking process is expelled into the atmosphere. Conversely, a non-recovery type oven utilizes the gases expelled from the coal in the coking process as fuel. Accordingly, less gas is expelled in a non-recovery oven. Moreover, the utilization of gas in the non-recovery type oven results in expected higher carbon content in the resultant coke than that in coke produced in a by-product type oven.

Even the Environmental Protection Agency (EPA) recognizes differences between by-product type ovens and non-recovery type ovens. For example, on July 29, 2004, the EPA issued Proposed Amendments to Air Toxics Standards for Coke Oven Batteries. This 2004 Amendment explains: "there are two types of coke oven batteries each utilizing a unique process to produce coke. One is known as a 'by-product coke oven battery' and the other is known as a 'non-recovery battery.'" The Amendment then sets forth different standards for the gases output from the by-product type oven and the non-recovery type oven. This type of difference in the standard shows that even the EPA recognizes a difference in the types of ovens utilized in the coking process. A copy of these Proposed Amendments are attached hereto as Exhibit A.

In light of the above illustration, it is clear that the Valia Reference would be understood by one of ordinary skill in the art to represent a general summary document for a layperson. One with ordinary skill in the art would know that significant differences exist between a by-product type oven and a non-recovery type oven. Thus, one with ordinary skill in the art would understand that a process acceptable for use in a by-product type oven would not necessarily be acceptable for use in non-recovery type oven due to these substantial differences. Nothing in the Valia Reference suggests otherwise.

No Reference Teaches an Apparent Specific Gravity of about 1.05

In rejecting the claims, the Examiner fails specifically to set forth which reference teaches a method of producing coke having a specific gravity of about 1.05. As set forth in the M.P.E.P., three basic criteria must be met to establish a case of *prima facie* obviousness.

> First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) *must teach or suggest all the claim limitations.* (emphasis added).

See M.P.E.P. § 2143. The Examiner has yet to point out which of the references teach or suggest heating coal to produce coke with a specific gravity of about 1.05.

If the Examiner believes the cited prior art references inherently disclose coke having an apparent specific gravity of about 1.05, Applicants remind the Examiner that "[t]he fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." *See* M.P.E.P. § 2112. Moreover, "[i]n relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). In rejecting the claims, the Examiner has thus far failed to demonstrate that either of the cited prior art references discloses a method in which the manufactured coke necessarily has a specific gravity of about 1.05.

Applicants believe the Examiner's assertion that Brayton must produce coke with an apparent specific gravity of 1.05, since Coke manufactured from the Brayton process may be used in steel making, is insufficient to support an argument that Brayton inherently discloses coke with an apparent specific gravity of 1.05. Applicants have included herein two related articles from the 1997 and 1998 Ironmaking Conference Proceedings.[1] See Exhibits B and C, respectively. These articles analyze coke quality parameters including CSR (coke strength after reaction), coal charge characteristics and pressure generation. In conducting their

[1] The articles were authored by Ted Todoschuk of Defasco Inc., John T. Price of Metallurgical Fuels Research and John F. Gransden of CANMET Energy Technology Centre. None of the authors are affiliated with the Applicants or Assignee of the present invention.

analysis, the authors of these articles also considered the apparent specific gravity of coke. Figures 8-11 of the 1997 paper include graphs comparing apparent specific gravity to various chemical and physical properties of the coke analyzed by the authors. The graphs comprising these figures do not even include an apparent specific gravity value of 1.05. Rather, 1.00 represents the highest value listed on an axis of the graph, and approximately 0.98 represents the highest actual apparent specific gravity.

Moreover, page 100, Table IV of the 1997 article summarizes the apparent specific gravity measured for the analyzed coke samples. Not one of the multitude of samples considered for the study had an apparent specific gravity as high as 0.975. In fact, the apparent specific gravity of the samples considered in this paper ranged from a low value of 0.800 to a high value of 0.962. None of the samples had an Apparent Specific Gravity approaching 1.05.

Exhibit D discloses testing conducted at the request of Applicants between July 21, 1998 and March 8, 1999 by the Commercial Testing & Engineering Co. (hereinafter "CTE") upon request of the Applicant. CTE analyzed various chemical properties of numerous samples of coke processed in by-product type ovens. The apparent specific gravity measured by CTE never exceeded 1.00 and ranged from a low of 0.75 to a high of 0.99. All of the coke tested by CTE came from samples of coke used to produce acceptable iron.

Furthermore, the assertion of the Examiner that AISI defines standards setting forth characteristics of coke necessary to product viable steel in the steel making process is incorrect. Applicants know of no standards set forth by AISI relating to steelmaking or coke production. Moreover, Applicants know of no regulating body for the steel making industry that sets any type of standards relating to steelmaking and coke production. If the Examiner is aware of any standard defining characteristics of acceptable coke for use in the steel making process, Applicants request that the Examiner cite these standards so that Applicants can review them.

Based upon the above, Applicants believe the argument that the coke of Brayton must inherently have a specific gravity of about 1.05, since the coke described therein may be used to produce acceptable iron must fail. Applicants have supplied a plurality of examples demonstrating that coke produced in by-product type ovens does not have an apparent specific gravity of about 1.05. In all of the research conducted by the Applicants, Applicants were unable to locate coke produced from a by-product type oven having an apparent specific gravity exceeding 1.00. Thus, as no reference cited by the Examiner discloses, either explicitly or inherently, coke with an apparent specific gravity of about 1.05, Applicants assert that claims 1-3, 5-12 and 14-18 are allowable over the cited prior art.

Claim 13

In rejecting claim 13, the Examiner makes two assertions. First, the Examiner states that the broken pieces of coal "can be broadly interpreted as a single mass." Secondly, the Examiner asserts, "Brayton does not require the breaking step." Applicants address these two statements individually below.

Single Mass

Applicants have amended claim 13 in order to clarify the claimed invention. Claim 13 no longer requires a single mass of compacted coal. Claim 13 now requires that a single compact of coal be disposed within the non-recovery type oven. Accordingly, even given a broad interpretation, Brayton does not disclose disposing a single compact of coal in the oven, and thus, does not disclose this claim limitation.

Optional Breaking Step

As explained above, the Examiner also states that Brayton does not require the breaking step. In making this statement, the Examiner does not provide any indication as to where Brayton presents the breaking step as optional. Applicants respectfully disagree with the assertion that this step is optional.

First, Figures 1 and 2 of Brayton depict flow diagrams showing preferred embodiments of the invention. These figures are the only two figures of Brayton depicting flow diagrams. Each of these figures depict processes including at least one set of breaking means. The breaking means are positioned within the process so as to break a coal compact formed in a compacting step.

Moreover, Brayton teaches the desirability of breaking the compacted coal after the compacting step. At column 2, lines 35-38 Brayton explains, "preferably in the breaking step at least about 95% of the compacted coal is reduced to particle sizes ranging from about one inch to less than about 100 mesh." Brayton then explains the desirability of having particle sizes of less than 1 inch. *See* generally, Brayton, column 4, lines 15-42.

In addition, Brayton sets forth at column 2, lines 60-62, that, according to the invention, the charging of the oven may be performed by the gravity flow method with the ovens closed. In a by-product type oven, the oven is charged through gravity via a plurality of ports located in the roof of the oven. Accordingly, Brayton could not charge the by-product oven with a single compact mass. Instead, Brayton breaks the compact in order to utilize the gravity feed made possible through the multiple ports in the roof. Moreover, the utilization of multiple ports in the roof of the oven, by definition, theoretically requires multiple charges. Thus, the compact must be broken in order to fully charge the by-product oven through the roof ports with a gravity feed.

Furthermore, Brayton discloses a process for use in a by-product type oven. As shown in the illustration on page 10 of this response, by-product type ovens are generally charged with multiple compacts, in order to reduce the voids within the overall charge. In non-recovery type ovens, a single mass of coal charge may be used, as depicted in the above illustration. These types of charges are obviously different.

Finally, the claims of Brayton all require breaking. In the method set forth in independent claim 1, Brayton sets forth the steps of first, compacting a finely divided coal, and second, breaking the formed compact. The other independent claim in Brayton, claim 22,

includes similar steps. Thus, the claims of Brayton clearly demonstrate that the breaking step is not optional for the invention taught therein.

For these reasons, Applicants believe that the invention disclosed by Brayton must include a breaking step. Accordingly, Brayton does not disclose a method including the step of disposing a volume of a single compact of coal into an oven. Thus, Applicants assert that Brayton does not render claim 13 of the pending application obvious.

CONCLUSION

An earnest attempt has been made to respond fully and completely to the Office Action of January 10, 2006. For the reasons set forth above, Applicants believe that all independent claims are allowable over the prior art. Moreover, as all dependent claims depend from the independent claims discussed above, Applicants further believe all dependent claims are also allowable over the prior art. Thus, Applicants assert the pending application is in condition for allowance, and accordingly, passage to issuance is respectfully solicited.

If necessary to effect a timely response, please consider this paper a request for an extension of time, and charge any shortages in fees, or apply any overpayment credits, to Baker & Daniels' Deposit Account No. 02-0387 (26041.50057). Please do not include the payment of issue fees.

Respectfully submitted,

Thomas J. Mauch
Reg. No. 56,686
BAKER & DANIELS LLP
205 West Jefferson Boulevard, Suite 250
South Bend, IN 46601
Telephone: (574) 234-4149
Fax: (574)239-1900